

Restoring public trust in science with the help of the humanities

Ivan Couée* 

The global COVID-19 pandemic has sharply highlighted society's awareness of science and science's impact on individuals and whole societies (Boyd, 2019; Thorp, 2020). But even before the virus began its spread around the globe, many ecological, social, health and economic problems have been clamouring for attention with society looking for science to develop solutions. At the same time, this greater awareness of the important role of scientific research has also led to more conflicting interactions between the public and the scientific community.

Scientists are generally well aware of their responsibilities, and interested and willing to consider the social, economic and political aspects of their research to find new solutions to global problems (Lackey, 2007; Boyd, 2019; Thorp, 2020). New forms of research organization and governance enable both scientific and socio-political debates; indeed, many argue that the natural sciences should engage more with the social sciences and the humanities to create a more humane and sustainable future.

However, there is a growing lack of confidence in or ignorance of science among the general public (Blancke *et al.*, 2015; Grams, 2019; Cardew, 2020), or even hostile attitudes against particular areas of science, notably agricultural research, vaccine development and, lately, against virology. Conversely, some scientists may be dismissive of public misunderstandings or concerns (Blancke *et al.*, 2015; Cardew, 2020). The increasing visibility of scientists in the mass media—not just in the wake of the COVID-19 pandemic—may also blur the boundaries between science and society and suggest that scientific debate is similar to a talk show. Such misunderstandings may

undermine trust in science while, paradoxically, the general public appreciates science as a source of novel ideas and solutions. In particular, strong-held views—about homoeopathy, against GMO or against vaccines—are often dismissive of scientific evidence and outlook while at the same time using science as a veil for legitimacy (Grams, 2019).

In general, even diverging views and anthropologies can be entwined with a great amount of scientific considerations, and, *vice versa*, science can accommodate a great diversity of worldviews and anthropologies (Blancke *et al.*, 2015; Sarewitz, 2015; Rovelli, 2016; McCoy, 2020). Yet, some worldviews are utterly at odds with scientific considerations: anti-vaccine attitudes or many conspiracy theories about SARS-CoV-2 are not at all supported by any evidence. It is therefore unlikely that science *per se* is sufficient to foster universal agreement on the common good, as there are limitations to the normative power of science. Scientists should acknowledge that, whatever the certainty or rationality that can be ascribed to scientific knowledge, society is also based on philosophical and political factors and importantly, on the freedom of choice, including erroneous ones (Sarewitz, 2015; Rovelli, 2016; McCoy, 2020). It is therefore important to analyse and discuss the complex relationship between science and worldviews. However, despite efforts to develop a “metascience”, an autoanalysis of science by science may be considered to be a contradiction in terms. For a variety of reasons, natural scientists share, trust and use the scientific method as the means to generate knowledge and place great confidence in its rationality and objectivity. In other words, there is a need to look at

science from other standpoints using other methods and principles.

Moreover, all research is imbued with human thought, intelligence and creativity, along with prior knowledge, worldviews, values and preferences. Conversely, science cannot be “purely” objective given that it is a brain process influenced by memories, views, values and so on. The complete denial of the influence of worldviews on science may even reflect a bias itself linked to a uniform cultural context. Comparative analysis of texts and ideas, both synchronically (at a given point in time) and diachronically (along the path of time), which are hallmarks of philosophy and the humanities, may provide an independent analysis of the interplay between objectivity/subjectivity and interpretation/ideology in scientific research.

In addition to analysing ideas and values, philosophy and linguistics provide critical and semiological analysis of languages and their relationships with meanings and concepts. Such analytical expertise is highly relevant for science, where novel words and expressions are constantly created to describe discoveries and insights. These words and expressions go through processes of maturation, evolution, drift or misunderstanding and are often used in different meanings or contexts. Current use of the word anthropocene thus goes far beyond its definition as a geological era, with a fashionable tendency to describe as “anthropocene” anything from “recent times” to any human activities. Additionally, mass communication and social media twist words and concepts from science to gain new meaning. Words like DNA, mutation, selection, ecosystem, invasive species or biodiversity have become pervasive in the media and everyday

language. Words themselves may not be the immediate cause of misunderstandings, but major science and society debates are interwoven with the use of symbolic or emblematic words. The term “genetically-modified organism” was conceived as a straightforward and unambiguous description, but it has given rise to endless discussions induced by unexpected ambiguities for novel biotechnological contexts such as cisgenesis, intragenesis or genome editing.

Furthermore, ranking and performance measures put pressure on scientists, laboratories, academic institutions and journals alike to self-promote and self-advertise their results and service. Advertisement and promotion increase the risk that words are misused or wrongly used so as to have a greater impact on media and the public, such as the “blueprint of life” to describe the full sequence of the human genome. Mass communication and social media can further amplify the use of such words or terms and *vice versa* prod scientists to adopt catchy terms and trendy vocabulary to draw attention. Scientists should be aware that their words and terms are readily transferred and amplified throughout the general public and that this often is at the expense of rigorous description. In the long term, this linguistic

bubble of exaggeration and hubris may cause more misunderstanding, more miscommunication or even conflict between scientists and the general public. The plasticity and dynamics of language that is necessary to find new words and metaphors for new discoveries may probably be hampered by strict linguistic rules. Nonetheless, scientific vocabulary and word use may also benefit from an ongoing process of self-reflection and self-improvement through peer-reviewed publications and discussions.

Scientific journals could therefore give more space to philosophy and the humanities to publish articles in their own right that analyse the worldviews, anthropologies, language and vocabulary that underlie the scientific articles they publish. Their analytical and contextual clout could help to refine the meaning of conceptual, general or anthropomorphic words and highlight underlying worldviews and anthropologies. The interfaces between science and society could be analysed and discussed from the viewpoints of science, of philosophy and the humanities, hopefully fostering thought-provoking questions and mutual respect between different fields of reason and rationality.

It may be argued that philosophical meta-analysis of scientific production of

knowledge is too abstract or too fuzzy. It has even been proclaimed that only science can produce an absolute knowledge and that philosophy is outdated (Rovelli, 2016). However, as the Italian physicist and writer Carlo Rovelli emphasized (Rovelli, 2016), the arguments of Aristotle in support of philosophy are not outdated: philosophy is at the heart of intellectual activities and helps to clarify perplexities and ambiguities; on the contrary, ignoring philosophical issues can lead to unexpected and irrational biases. Transparency under the light of philosophy and humanities should contribute to upholding and enriching the rigour of science and to restore public trust in the science endeavour.

References

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